In the Claims

1. (original) A square root calculator comprising:

a binary searching module operable to accept a number, perform a binary search operation, and return an integer portion of the square root of the number;

a fraction calculating module operable to calculate a fractional portion of the square root; and

a summing module operable to sum the integer portion and the fractional portion to obtain the square root.

2. (original) The square root calculator of claim 1, wherein the square root has a precision and the number comprises bits having varying degrees of significance, the calculator further comprising:

a prescaling module operable to scale the number if the number is smaller than a desired maximum value prior to calculating the square root of the number, wherein scaling includes multiplying the number by a first fixed scale value to increase the significance of the bits; and

a postscaling module operable to scale the square root, wherein in scaling includes dividing the square root by a second fixed scale value to increase the precision of the square root.

3. (original) The square root calculator of claim 1 further comprising:

a lower boundary condition module operable to determine whether the number is zero and setting the square root equal to zero if the number is zero.

4. (original) The square root calculator of claim 1 further comprising:

an upper boundary condition module operable to determine whether the number is a maximum value and setting the square root equal to the square root of the maximum value.

5. (original) The square root calculator of claim 1 further comprising a fixed-point microprocessor having a register storing the integer portion and the fractional portion, wherein

the integer portion is stored in a set of most significant bits of the register and the fractional portion is stored in a set of least significant bits of the register.

6. (original) The square root calculator of claim 1 wherein the binary search module includes a delay module operable to delay the returning of the integer portion so that time to perform the binary search operation is substantially consistent for each iteration.

7-16. (canceled)

17. (previously presented) An apparatus operable to accept a number, perform a binary search operation, and return an integer portion of the square root of the number; operable to calculate a fractional portion of the square root; and operable to sum the integer portion and the fractional portion to obtain the square root.

18. (previously presented) The apparatus of claim 17 further comprising:

an actuator arm rotatably mounted adjacent a storage medium;

a transducer head mounted on the actuator arm for reading and writing data from and to the storage medium, the transducer head moving at a velocity relative to tracks on the storage medium as the actuator arm moves; and a means for calculating a velocity reference by calculating a square root for use in adjusting the velocity of the transducer head to achieve the velocity reference.

19. (previously presented) The apparatus of claim 18 wherein the storage medium includes a plurality of tracks and the means for calculating the velocity reference includes a seek profile generator for generating a velocity profile while the transducer head moves from a first track to a second track.

20. (previously presented) The apparatus of claim 19 wherein the seek profile generator includes a velocity reference generator operable to calculate the square root of a squared velocity value that is in part a function of a position error, wherein the position error is the difference between the first track and the second track.

21. (previously presented) The disc drive of claim 20 wherein the squared velocity value is further a function of a deceleration constant.

22. (previously presented) The disc drive of claim 21 wherein the seek profile generator further comprises a constant deceleration generator operable to calculate the deceleration constant based in part on an initial seek distance.

23. (previously presented) The disc drive of claim 18 wherein the means for calculating the velocity reference comprises:

a calculating module operable to receive the position error and the deceleration constant and perform the function to yield the squared velocity value;

a binary searching module operable to receive the squared velocity value and returning an integer portion of the velocity reference;

a fraction calculating module operable to calculate a fractional portion of the squared velocity reference; and

a summing module operable to sum the integer portion and the fractional portion to obtain the velocity reference.